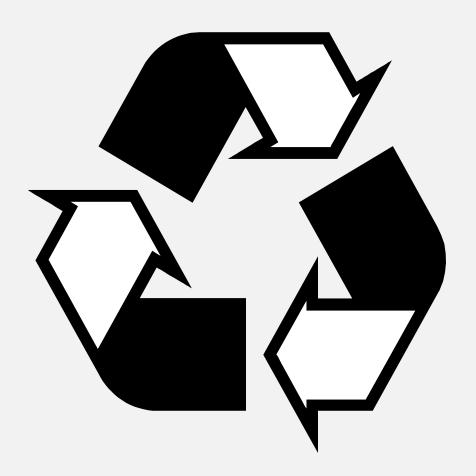
Minimizing Construction & Demolition Waste



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Solid Waste Management in Hawaii

I istorically, Hawaii's primary solid waste management option has been disposal in landfills. With shortages of landfill sites and stricter federal government regulations (40 CFR 258 "Subtitle D") requiring a significant upgrading of waste disposal facilities, the state legislature directed the Department of Health to evaluate solid waste management practices in the state and develop a statewide plan. The result of the study was the 1991

Integrated Solid Waste Management (ISWM) Plan.

The Plan is a comprehensive document focusing on reducing the generation of waste by moving away from the traditional method of waste disposal in landfills and incinerators. The three main waste reduction methods advocated in the plan are source reduction, recycling and composting. The Plan established statewide waste reduction goals of 25% by 1995, and 50% by year 2000. It is a guidance document which evaluated existing solid waste practices in the state and developed a framework to move Hawaii toward sustainable waste management as a first priority and disposal as a final resort. It concluded that Hawaii had a need to plan for incineration with energy recovery and

landfilling but those efforts should not jeopardize the priorities for source reduction, recycling, and composting.

Concurrent with the Plan, the legislature passed Act 324-91 which requires that the countries develop their own detailed ISWM Plans to insure the diversion of solid waste from landfills and incinerators. While we have fallen short of our waste diversion goal for 2000, the State did achieve a waste diversion rate of 25% in 1997, 50% by 2000. We will need to see a significant increase in recycling to meet the 50% goal by the year 2010.

Construction and Demolition
(C&D) material has been targeted for landfill diversion by the City & County of Honolulu

and the Neighbor
Island counties
because of the
significant
amount
generated.
Studies conducted by the
various counties have shown that in 199
over 2 million tons of solid waste were

various counties have shown that in 1995, over 2 million tons of solid waste were generated in Hawaii. As much as 30% of that waste, or 600,000 tons/year, was estimated to be C&D material.

Construction And Demolition Waste Management

Across the country, the volume of C&D waste is growing as older buildings are being demolished to make way for new ones. Over the last few years on Oahu, we've seen many major downtown and military structures torn down and replaced as we continue to increase urban densities. The majority of this material ends up in Oahu's landfills, but a significant amount is disposed of in a growing number of illegal dumps.

In Hawaii today, there is one privately owned C&D landfill at Nanakuli on the island of Oahu and another on the island of Maui. The other major islands do not have C&D landfill. On these islands, C&D waste is being disposed at municipal solid waste (MSW) landfills. MSW landfills, in contrast to C&D landfills, are more costly to

construct and operate because they must comply with stringent federal regulations. C&D waste which is disposed of in MSW facilities takes up valuable disposal space.

As a result of the Integrated Solid Waste Management Plan, progress has been made in implementing improved solid waste disposal methods which protect the environment. These improvements, however, were necessary to comply with the federal regulations imposed on disposal facilities. If we want to become a sustainable society, Hawaii must work to divert waste from disposal. Let's examine some of the reasons for reducing our generation of C&D waste and recycling what we generate.

Extending The Life Of Our Landfills

Land fill space in Hawaii is rapidly decreasing. As an island state, we have limited available land and no one wants a dump in their neighborhood. As previously mentioned, the State of Hawaii enacted legislation requiring that the counties develop policies aimed at reducing the waste sent to landfills. To reach our goals, it is essential that the C&D waste stream is managed through source reduction, reuse, and recycling efforts. Fortunately, there can be considerable cost savings for construction

and demolition contractors who reduce or recycle those materials. These savings will increase as landfill capacity diminishes and disposal costs increase in the coming years.

Unfortunately, as landfill costs increase, incidents of illegal dumping are on the rise. Commercially operated dump sites which primarily focus on C&D waste pose a significant threat to public health and the environment. Establishing viable recycling options can help reduce the occurrence of illegal dumps.

Conserving Our Natural Resources

onstruction, demolition and landclearing materials can be recycled into a number of useful products. Concrete and asphalt wastes can be crushed for use as aggregate base in road construction; metal can be sold as scrap to processors for recycling. Untreated wood and green wastes can be used as mulch or processed into compost; new

drywall scrap can used to amend organic compost or for direct land application; and corrugated cardboard can be recycled into new cardboard packaging. All of these recycling efforts help to conserve natural resources, one of the primary goals of resource recovery.

Reducing Waste Hauling And Disposal Costs

f your construction, demolition, and landclearing materials are currently being sent to a landfill, your disposal costs may be unnecessarily high. The tipping fees at Oahu's only C&D landfills range from \$10 to 20 per ton. Some recycling facilities may accept clean concrete and asphalt for little or no charge. The cost of transporting materials to recycling processors is a concern to contractors. Trucking and transportation costs are estimated at \$75 per hour each way. As shown in the listings in the guide, the number of recycling options on Oahu are growing, and many are located much closer to population centers than MSW and C&D landfills. Your company may save money through reduced hauling and avoided disposal costs.

In addition, many contractors are already receiving revenues

from the sale of pre-sorted materials such as scrap metal and cardboard. Contractors can arrange to have bins provided and have source separated C&D materials hauled from construction sites. There are also processing firms that will provide on-site crushers for recycling and reuse of concrete and asphalt. This eliminates hauling and disposal fees, and the contractor can avoid purchasing structural fill or aggregate. Some waste haulers may offer special services, at reduced fees, for clean, partially separated construction materials.

This guide describes how to reduce the volume of construction and demolition debris going into local landfills. It also provides specific information about reducing, reusing, and recycling the volume of construction and demolition materials at the source.

What Is Construction And Demolition Waste?

CONSTRUCTION AND DEMOLITION (C&D) waste is defined as solid, largely inert waste resulting from the construction, repair, demolition, or razing of buildings, roads and other structures. The term also includes the land clearing debris from the clearing of land for construction.

This waste stream includes, but is not limited to: concrete, brick, asphalt, gypsum, wood waste, roofing and roofing paper, glass, ferrous and nonferrous metals, soil, trees, and shrubs.

REDUCE, REUSE, RECYCLE

Diverting waste from our disposal facilities involves finding ways to reduce, reuse and recycle. There are many advantages and benefits to waste reduction. We protect our environment and economic resources. We use less raw materials and thereby less energy to extract or harvest them from our natural environment. We

reduce the need for expensive and environmentally damaging disposal options and we create a market for waste materials to be used for recycling. The following discussion will provide an overview of some alternatives to disposal for C&D waste.

Waste Reduction

For a successful C&D waste reduction program, we need to educate the public, businesses, developers, contractors, and architects to use less and still achieve success. When designers and builders understand the negative impact that waste has on the environment, and the positive impact they can make in their efforts to reduce waste, they can be more proactive.

Architects must think ecologically about design and should design to use less. Bigger is not necessarily better. There are a number of ways in which Architects can contribute to this effort. The following is a checklist of things Architects should consider when specifying a product in the design of a project:

- * Does the design or construction process reduce waste? Can standard lumber and drywall sized, precut lumber be used?
- * Do the products specified include recycled content?
- * Does the project use locally available and often overlooked resources?
- * Are the products or materials specified easily recyclable?
- * Can the products or materials specified be easily reused or salvaged?

For additional information, review "Residential Construction Waste Management, A Builders Field Guide" by the National Association of Home Builders; or contact the Environmental Building Coalition of Hawaii (955-8341). The Clean Hawaii Center (587-3810) or the Office of Solid Waste Management (586-4240).

The Re-use Concept: Materials Exchanges

Some materials can be separated and reused in their existing from at the site, or later by other businesses and organizations. High value items such as doors, windows, fixtures and equipment may be accepted by local non-profit organization for self-help projects. In addition some contractors have found an outlet for good size pieces of scrap plywood and drywall. The Hawaii Materials Exchange (HIMEX) can provide a means of listing your unwanted items on a statewide computerized data base. Also, there are a number of non-profit organizations and some businesses who can take partially used paint

for community beautification. By participating in a materials exchange, a company can improve its bottom liner by reducing hauling and disposal fees and providing a tax deduction while helping the community. Using materials exchanges requires advance planning. While many local organizations may be able to reuse your unwanted materials, the timing of your project and collection or drop off requirements must be addressed in advance. See the reusable building materials section at the end of this guide.

Waste Recycling

How about recycling? Take scrap lumber, which due to its size or condition, cannot be reused, cut, press and glue it together into press board - you are recycling it. The wood fiber has gone through a remanufacturing process. This added step which requires energy and may have environmental implications is why, if reuse is cost-effective, it is preferred over recycling. But recycling can provide significant benefits over making the product from virgin material. Today's waste entrepreneurs use heavy-duty, industrial materials. Some current efforts in reuse and recycling of C&D waste in Hawaii are:

- * Excavated Dirt: used for fill or topsoil.
- * Excavated Rock: crushed to use as road base material.
- * Concrete: crushed and used for road base, backfill or sub-base for building construction.
- * Asphalt: crushed for use as

- aggregate or road base.
- * Untreated Wood waste: ground for use as mulch or biofuel.
- * Landclearing and green waste: ground for use as mulch or for compost.
- * Steel: processed for shipment to steel mills out of state.
- * Cardboard: baled for shipment to paper mills out of state.

In addition, innovative local businesses are investigating applications for drywall in compost and so il amendment; asphalt shingles cold patch for road repair; and treated lumber as boiler fuel or for wallboard.

Managing C&D Waste: A Checklist

CONDUCT AN INFORMAL WASTE AUDIT

Determine the amounts, types, and time-frame for construction and demolition materials generated by your projects. Calculate any possible cost savings from reducing a portion of this waste stream, in terms of hauling and disposal cost avoidance.

REDUCE

Investigate strategies for reducing construction and demolition waste materials. Proper materials management practices can result in cost savings. Assure that precise estimates are made prior to purchasing materials, and that accurate measurements are made prior to cutting materials so that excess scrap and end cuts can be avoided.

Consider having materials pre-cut at lumber yards, using engineered wood products, steel framing, or other pre-manufactured components. Work with your suppliers and subcontractors to minimize excess packaging and other non-essential material from being brought on site.

REUSE

Consider the potential for others to use the materials you normally discard. Consider planning ahead and phoning HIMEX, Habitat for Humanity, or other non-profit organizations to list such materials or to arrange donations. This can provide your company with valuable tax deductions. Conduct site pre-assessments for demolition projects to evaluate the kinds of materials that can be salvaged for reuse, such as cabinets, architectural woodwork, light fixtures, and appliances.

RECYCLE

Investigate the companies listed in this guide that can recycle some of your construction and demolition waste from bother source-separated or mixed loads. Be sure to compare the costs of recycling with the costs of disposal. Contact haulers. Many times they can help you set up an effective separation program. Work with your subcontractors to keep recyclable scrap from being mixed with trash during clean-up.

EDUCATE EMPLOYEES, CONTRACTORS, AND SUBCONTRACTORS

Whatever waste reduction strategies you choose, remember that it is crucial to educate and motivate your employees and subcontractors for maximum participation. Emphasize that source reduction, reuse, and recycling is everybody's business.

Beginning a
Construction and
Demolition
Recycling
Program

The first step in recycling construction and demolition waste materials is to preassess the amounts and composition of your waste; the time frame in which materials will be generated; and the amount of space available for separation of materials at the site.

With this information, you can begin to determine what wastes will be generated and if quantities will be significant enough to warrant source separation. Depending on the availability of storage and hauling, decisions can be made as to what materials to separate from the mixed wastes.

Of course, the more materials which are eliminated from the mixed wastes, the less material that must be hauled for disposal and the more money you can save.

C & D WASTE MANAGEMENT FACILITIES

AGGREGATE	LUMINUM, BRASS, COPPER	9
		Services:
ISLAND DEMO, INC. 2769 Kilihau Street Honolulu, HI 96819	(808) 839-5522 (808) 839-5515 (fax)	Accepts construction and demolition debris
KAPAA TRANSFER STATION Kapaa Quarry Access Road Kailua, HI 96734	(808) 262-2628	Disposal Services: Accept wood shingles, asphalt paper and wood 4' long or less
Kawailoa Transfer Station Kawailoa Drive Haleiwa, HI 96712	(808) 637-5511	Disposal Services: Accept wood shingles, asphalt paper and wood 4' long or less
KEEHI TRANSFER STATION 606 Middle Street Honolulu, HI 96818	(808) 845-1162	Disposal Services: Accept wood shingles, asphalt paper and wood 4' long or less
AGGREGATE		
HAWAIIAN BITUMULS & PAVING (110 Puuhale Road Honolulu, HI 96819	(808) 845-3991 (808) 842-3220 (fax)	Services: Process recycled asphalt paving for sale as asphalt and road base

RESOURCE RECOVERY, LTD. P.O. Box 17127 Honolulu, HI 96817	(808) 845-6271 (808) 842-1904 (fax)	Services: On-site crushing of reinforced concrete for use as fill and secondary road base
GLASS		
ISLAND RECYCLING, INC. 1811 Dillingham Blvd. Honolulu, HI 96819	(808) 845-1188 (808) 842-0907 (fax)	Services: Crush glass for use as aggregate in cement base materials
50 Sand Island Access Road Honolulu, HI 96819		
TOMRA RECYCLING NETWORK 99-1160 Iwaena Street Aiea, HI 96701-3258	(808) 487-2802 (808) 486-7753 (fax)	Services: Recycle/buy-back center for glass at Haleiwa location only
FERROUS METALS - STEEL		
C.M. RECYCLING Co. 411 Puuhale Road	(808) 842-6640	Services:
Honolulu, HI 96819	(808) 842-6733 (fax)	Purchase and process ferrous and non-ferrous scrap
	(808) 842-6733 (fax)	-
Honolulu, HI 96819 HAWAII METAL RECYCLING Co. (91-056 Hanua Street Campbell Industrial Park	(808) 842-6733 (fax) (HMR) (808) 682-5810	non-ferrous scrap Services: Recycle/buy-back center for ferrous
Honolulu, HI 96819 HAWAII METAL RECYCLING Co. (91-056 Hanua Street Campbell Industrial Park Kapolei, HI 96707 ISLAND RECYCLING, INC. 1811 Dillingham Blvd.	(808) 842-6733 (fax) (HMR) (808) 682-5810 (808) 682-0604 (fax) (808) 845-1188	non-ferrous scrap Services: Recycle/buy-back center for ferrous metals Services: Recycle/buy-back center for ferrous

NON-FERROUS METALS - ALUMINUM, BRASS, COPPER, AND STAINLESS STEEL

C.M. RECYCLING Co. 411 Puuhale Road Honolulu, HI 96819	(808) 842-6640 Purchase and process ferrous a non-ferrous scrap	
HANS METALS INC. 94-170 Leokane Street Waipahu, HI 96797	(808) 676-4797 (808) 671-0729 (fax)	Services: Buy-back center for non-ferrous scrap metals
Island Recycling, Inc. 1811 Dillingham Blvd. Honolulu, HI 96819	(808) 845-1188 (808) 842-0907 (fax)	Services: Buy-back center for aluminum and non-ferrous metals
50 Sand Island Access Road Honolulu, HI 96819		
LENOX RESOURCES, INC. 91-445 Komohana St. Campbell Industrial Park Kapolei, HI 96707	(808) 682-5539 (808) 682-4923 (fax)	Services: Accepts non-ferrous metals and electronic equipment for recycling
OAHU METAL AND SUPPLY, LTD. 204 Sand Island Access Road Honolulu, HI 96819	(808) 845-3275 (808) 841-4856 (fax)	Services: Drop-off/buy-back center for non-ferrous metals
OKUDA METALS, INC. 1804 Kahai Street Honolulu, HI 96819	(808) 845-6856 (808) 842-0249 (fax)	Services: Accept aluminum scrap, brass, copper, lead, and stainless steel
TOMRA RECYCLING NETWORK 99-1160 Iwaena St. Aiea, HI 96701-3258	(808) 487-2802 (808) 486-7753 (fax)	Services: 15 buy-back centers on Oahu for aluminum, copper, and brass

WOOD AND GREENWASTE

C. BARTON POTTER Co. 3115 La i Road Honolulu, HI 96816	(808) 735-1463 (808) 735-1463 (fax)	Services: Accept high quality logs, milling them into lumber for various commercial uses
HAWAIIAN EARTH PRODUCTS, LT P.O. Box 1166 Ewa Beach, HI 96706	(808) 682-5895 (808) 682-0762 (fax)	Services: Drop-off site for processing of clean yard trimmings into Menehune Magic organic soil amendments
KALAHEO GREENWASTE RECYCI P.O. Box 26176 Honolulu, HI 96825	ING FACILITY (808) 261-9400 (808) 396-7430 (fax)	Services: Accept green trimmings and untreated wood for mulching and composting

CARDBOARD

HORIZON WASTE HAWAII (formerly BFI)		Services:	
207 Puuhale Road	(808) 842-3181	Pick-up and drop-off/buy-back	
Honolulu, HI 96819	(808) 842-0979 (fax)	center for cardboard and aluminum	
HONOLULU RECOVERY SYSTEMS		Services:	
P.O. Box 6356	(808) 842-3602	Pick-up and drop-off/buy-back	
Honolulu, HI 96819-6356	(808) 841-2438 (fax)	center for cardboard and aluminum	
ISLAND RECYCLING, INC.		Services:	
1811 Dillingham Blvd.	(808) 845-1188	Pick-up and drop-off/buy-back	
Honolulu, HI 96819	(808) 842-0907 (fax)	center for cardboard and aluminum	
LENOX RESOURCES, INC.		Services:	
91-445 Komohana St.	(808) 682-5539	Drop-off center for cardboard	
Campbell Industrial Park	(808) 682-4923 (fax)	-	
Kapolei, HI 96707			

FURNITURE, FIXTURES AND EQUIPMENT/REUSABLE BUILDING MATERIALS*

	Services:
(808) 377-1841	Accept donations of appliances,
(808) 377-9790 (fax)	furniture and household items which
	they donate to homeless families or
(808) 668-7336	for resale to the public
	(808) 377-9790 (fax)

APPLIANCE REBUILDERS, INC. 150 Hamakua Drive, Suite 4125 Kailua, HI 96734	(808) 845-1388 (808) 847-6087 (fax)	Services: Rebuild or recycle used home appliances; will remove and haul appliances in bulk
CHRISTMAS IN APRILOAHU 733 Bishop St., Suite 170-433 Honolulu, HI 96813	(808) 543-0900	Services: Accept donations of building materials for use in annual community service housing rehab projects for the needy
GOODWILL INDUSTRIES 2610 Kilihau Street Honolulu, HI 96819	(808) 836-0313 (808) 833-4943 (fax)	Services: Accept donations of small appliances and other household items
HABITAT FOR HUMANITY 2728 Huapala Street Honolulu, HI 96822	(808) 988-9339 (808) 988-2498 (fax)	Services: Accept donations of building materials for use in self-help housing projects
HAWAII MATERIALS EXCHANGE P.O. Box 121 Wailuku, HI 96793	(808) 586-4240 (808) 586-7509 (fax)	Services: Computerized material exchange of new, used and recyclable building materials; interactive web site at www.himex.org
PROJECT RENEWAL 1374 Nuuanu Avenue Honolulu, HI 96817	(808) 531-7795 (808) 531-7795 (fax)	Services: Accept donations and will remove and pick up used building material and other household and commercial items
SALVATION ARMY 322 Sumner Street Honolulu, HI 96817	(808) 522-8411 (808) 522-8492 (fax)	Services: Accept donations for resale of furniture and small appliances; call for pickup of larger items

^{*}Also see the latest Hawai i Reuse Industry Guide published by DBEDT: (808) 587-3802

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HAWAIIAN EARTH PRODUCTS P.O. Box 1166 Ewa Beach, HI 96706	Box 1166 (808) 682-5895	
APPLIANCES AND FREON		
HAWAII METAL RECYCLING Co. 91-056 Hanua Street Campbell Industrial Park Kapolei, HI 96707	(808) 682-5810 (808) 682-0604 (fax)	Services: Recycle/buy back center for ferrous metals (freon, capacitors and compressors must be removed from air conditioners and refrigerators)
REFRIGERANT RECYCLING, INC. 91-120 Hanua Street Campbell Industrial Park Kapolei, HI 96707	(808) 682-1555 (808) 682-1904 (fax)	Services: Processing and recycling of air conditioners, refrigerators and other appliances
TIRES		
ABE S AUTO RECYCLERS, INC. 96-1268 Waihona Street Pearl City, HI 96782	(808) 455-4200 (808) 456-4681 (fax)	Services: Recycle tires
UNITEK SOLVENT SERVICES 2889 Mokumoa St. Honolulu, HI 96819	(808) 682-8284 (808) 831-3086 (fax)	Services: Recycle tires
ELECTRONICS		
LENOX RESOURCES, INC. 91-445 Komohana Street Campbell Industrial Park Kapolei, HI 96707	(808) 682-5539 (808) 682-4923 (fax)	Services: Accepts electronic equipment for recycling

C & D LANDFILL

PVT LAND COMPANY 87-2020 Farrington Highway	(808) 668-4561	Services: Accepts construction and demolition
Waianae, HI 96792	(808) 668-1368 (fax)	site materials, including: concrete, hollow bituminous concrete, asphalt pavement, wood, glass masonry, flooring, siding plaster, dirt, rock, stumps, boulders and brush

NEIGHBOR ISLAND C & D RECYCLING FACILITIES

KAUAI

KAUAI NURSERY & LANDSCAPING 3-1550 Kaumualii Highway (808) 245-7747 Lihue, HI 96766 (808) 245-9289 (fax)		Services: Green waste, clean lumber
GARDEN ISLE DISPOSAL 2666 Niumalu Road Lihue, HI 96766	(808) 245-2372 (808) 245-2435 (fax)	Services: Cardboard

MAUI

MAUI SCRAP METAL P.O. Box 1172 Wailuku, HI 96793	(808) 244-0305	Services: Scrap metal and cardboard
MAUI COMPOSTING P.O. Box 1282 Wailuku, HI 96793	(808) 877-0403	Services: Green waste and new drywall
MAUI EKO SYSTEMS P.O. Box 1065 Puunene, HI 96784	(808) 572-8844 (808) 877-7589 (fax)	Services: Green waste and clean lumber
CAMPAIGN RECYCLE MAUI P.O. Box 1469 Wailuku, HI 96793	(808) 244-0722	Services: Green waste and clean lumber

DE COITE C & D LANDFILL P.O. Box 3 Pukalani, HI 96788	(808) 871-7496 (808) 877-6412 (fax)	Services: Accepts construction and demolition site materials, including: concrete, hollow bituminous concrete, asphalt pavement, wood, glass masonry, flooring, siding plaster, dirt, rock, stumps, boulders and brush

HAWAII

HAWAII METAL RECYCLING Co. 190 Keaa Street Hilo, HI 96720	(808) 961-3982 (808) 933-9376 (fax)	Services: Recycle/buy back center for ferrous metals (freon, capacitors and compressors must be removed from air conditioners and refrigerators)
RENEW HAWAII P.O. Box 11046 Hilo, HI 96721	(808) 895-5665	Services: Green waste
HILO BUSINESS SERVICE P.O. Box 4904 Hilo, HI 96720	(808) 959-1436 (808) 959-1224 (fax)	Services: Cardboard
Environmental Recycling 30 Makaala Street Hilo, HI 96720	(808) 935-9328	Services: Cardboard

For further information on construction and demolition recycling, please contact:

Department of Health Office of Solid Waste Management www.state.hi.us/health/eh/shwb/sw (808) 586-4240